Let's SiSE Agile Program Requirements!

Introducing Simplified Software Estimation (SiSE)

Joint IT Software and Cost Forum
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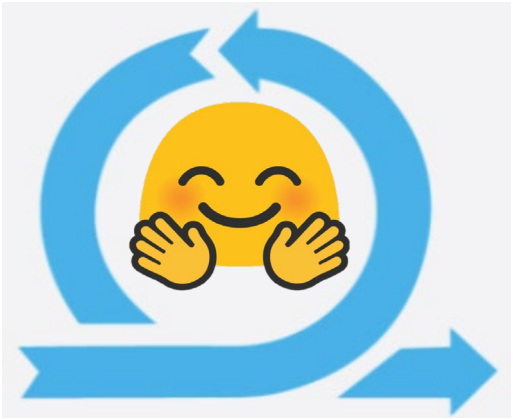


History of SiSE at DHS

2017

DHS USM charge to CAD about s/w cost estimates:

1. Increase credibility & accuracy
2. Decrease cycle time

2020

DHS Financial MGMT Policy Manual:

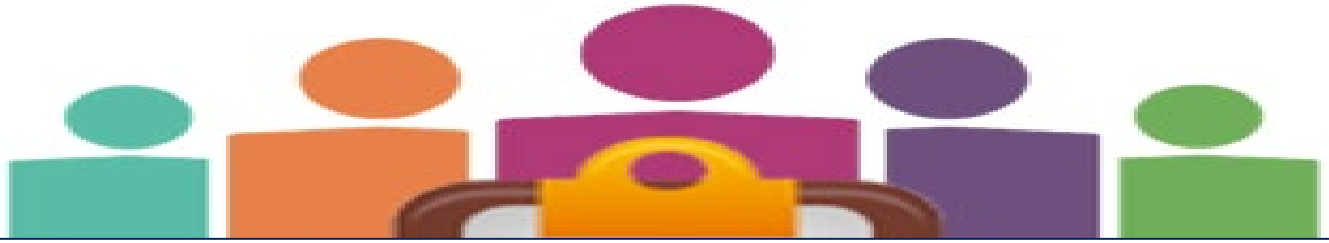
All Level 1 & 2 Agile software dev program estimates shall use Simple FP

IT Dashboard.gov:

DHS IT budget is 3rd largest in Federal Government @ $7.4B

2021

Poll Question #1



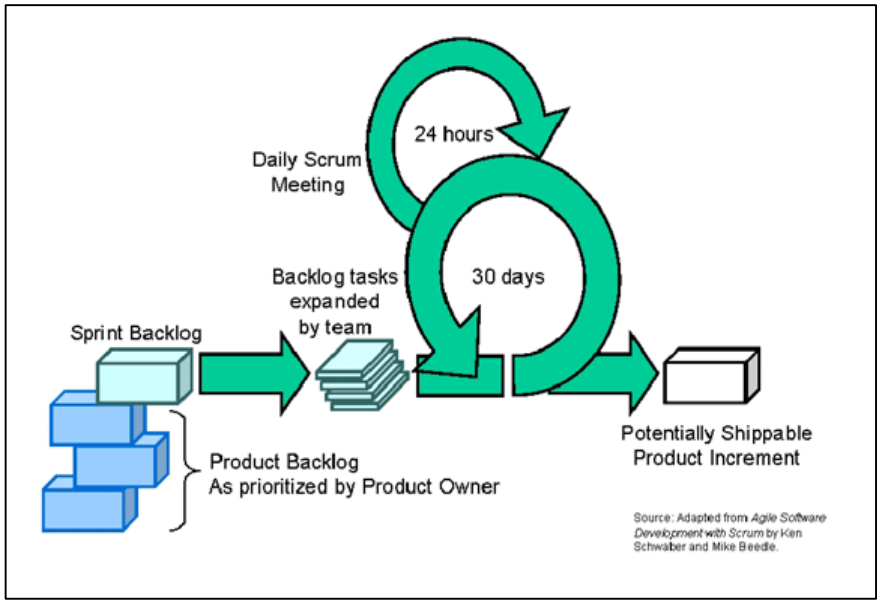
b. DOD
c. Other Federal Agency
d. Non-Government / Industry

Pre-requisites for a Realistic Agile Estimate

- ✓ Scope and purpose of the estimate
- ✓ Complexity of software, and capability of development team
- ✓ Program data: new development/enhancement, COTS, language, platform, etc.
- X ***Estimated Size*** of release or product backlog in standard units of measure (SLOC or FP)

- ✓ Scope of historical data
- ✓ Complexity of software, and capability of development team
- ✓ Program data: new development/enhancement, COTS, language, platform, etc.
- ✓ **Software size** in standard units of measure: SLOC, FP, SP
- ✓ **Effort** in standard units of measure: hours, sprint

Pre-requisites for a Realistic Agile Estimate



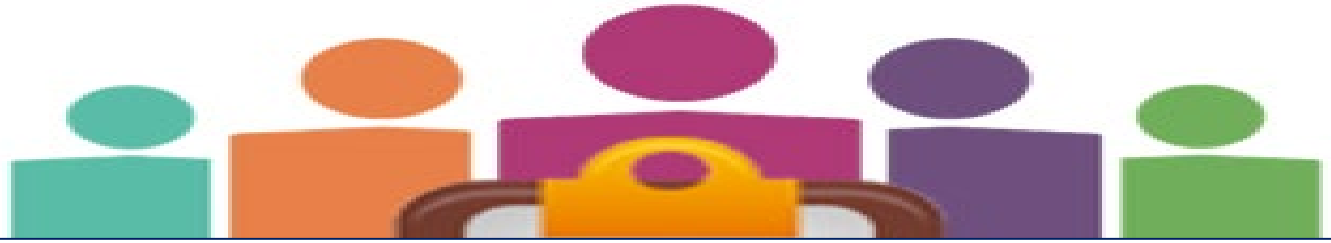
In simplistic terms:

- **Effort** = **Size** * **Throughput**
- **Cost** = **Effort** * Labor Rate
- **Schedule/duration (months)** = **Effort** / (FTE Team Size * Hours per person-month)

Size * **Throughput** = **Effort**

Size	Throughput	Effort
(Estimated amount of functionality in product backlog; includes factors for economies of scale)	(Rate that functionality can be developed)	(Time needed for development)

Poll Question #2

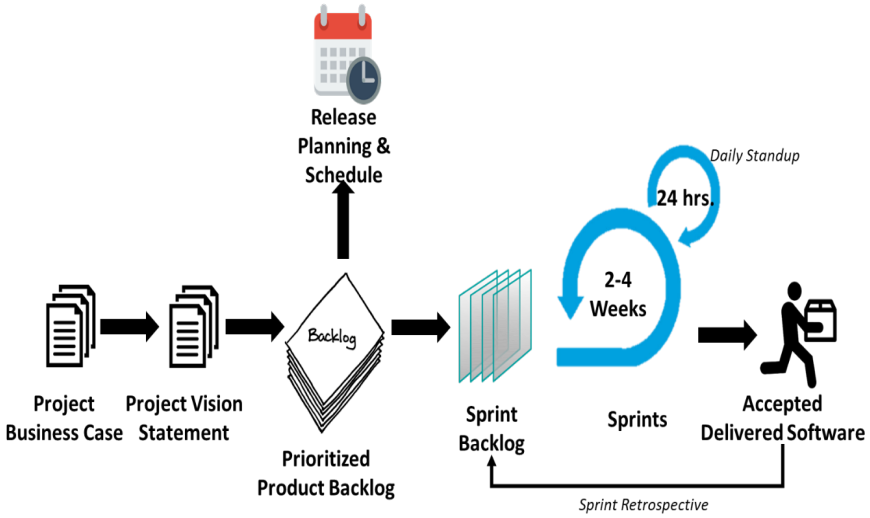


How much of your program has Agile software development?

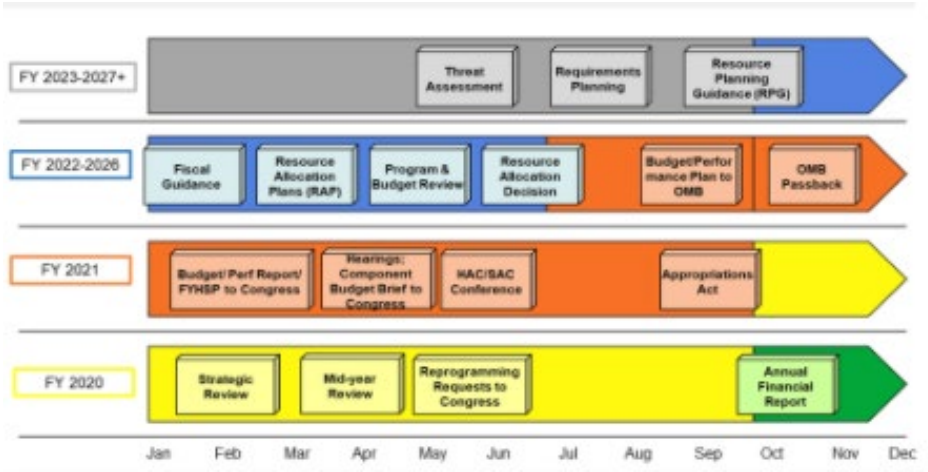
a. A little, mainly hardware with some software components (0% -25%)
b. Some, most software is still COTS (~26% - 50%)
c. A good amount, but there are other parts to the program (~51% - 75%)
d. A lot, the program is only developing software (~76% - 100%)
e. I don't know

Agile Requirements vs. Federal Acquisition Cycle

The challenge: How to create realistic software ***size-based*** cost estimates for agile software development from a high-level product backlog for short- and long-term planning?

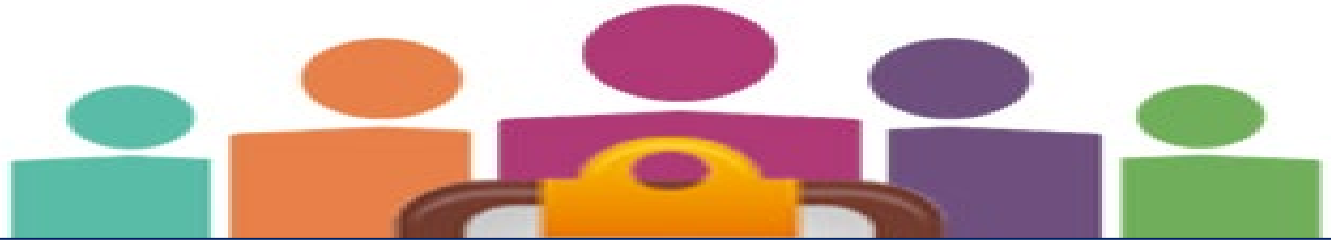


Agile Scrum Process



DHS PPBE Process

Poll Question #3



What is your organization's preferred software sizing/estimating method?

a. SLOC or ESLOC
b. Story Points
c. Function Points
d. SME Judgment
e. Not Sure/Don't Know
f. Other (Tell us in the chat!)

Issue #1: What unit of measure is best for estimating Agile Program size?

Unit of measure	Measure of…	Standard Yes/No	What is needed?	Pros	Cons
Source Lines of Code (SLOC) or ESLOC	Physical size	Yes	Delivered code	• Historical data available • Good for Rough Order of Magnitude (ROM)	• Coding language and skill dependent • Can't be used with user stories
Story Points	Relative size	No	User stories	• Agile vernacular • Easy to estimate within team	• Only valid within team • Can't be independently estimated/analyzed
IFPUG* Function Points (FP)	Functional size	Yes	Detailed requirements	• ISO standardized • Can be used across programs	• Need detailed requirements to count • Requires training
Simple FP (SiFP)	Functional size	Yes	CONOPS/ user stories	• Can be used across programs • Can estimate from high-level requirements (CONOPS or user stories)	• Requires training (but less than FP)

Different sizing units provide different levels of program insight

*International Function Point Users Group

DHS chose Simple FP (SiFP) units for SiSE

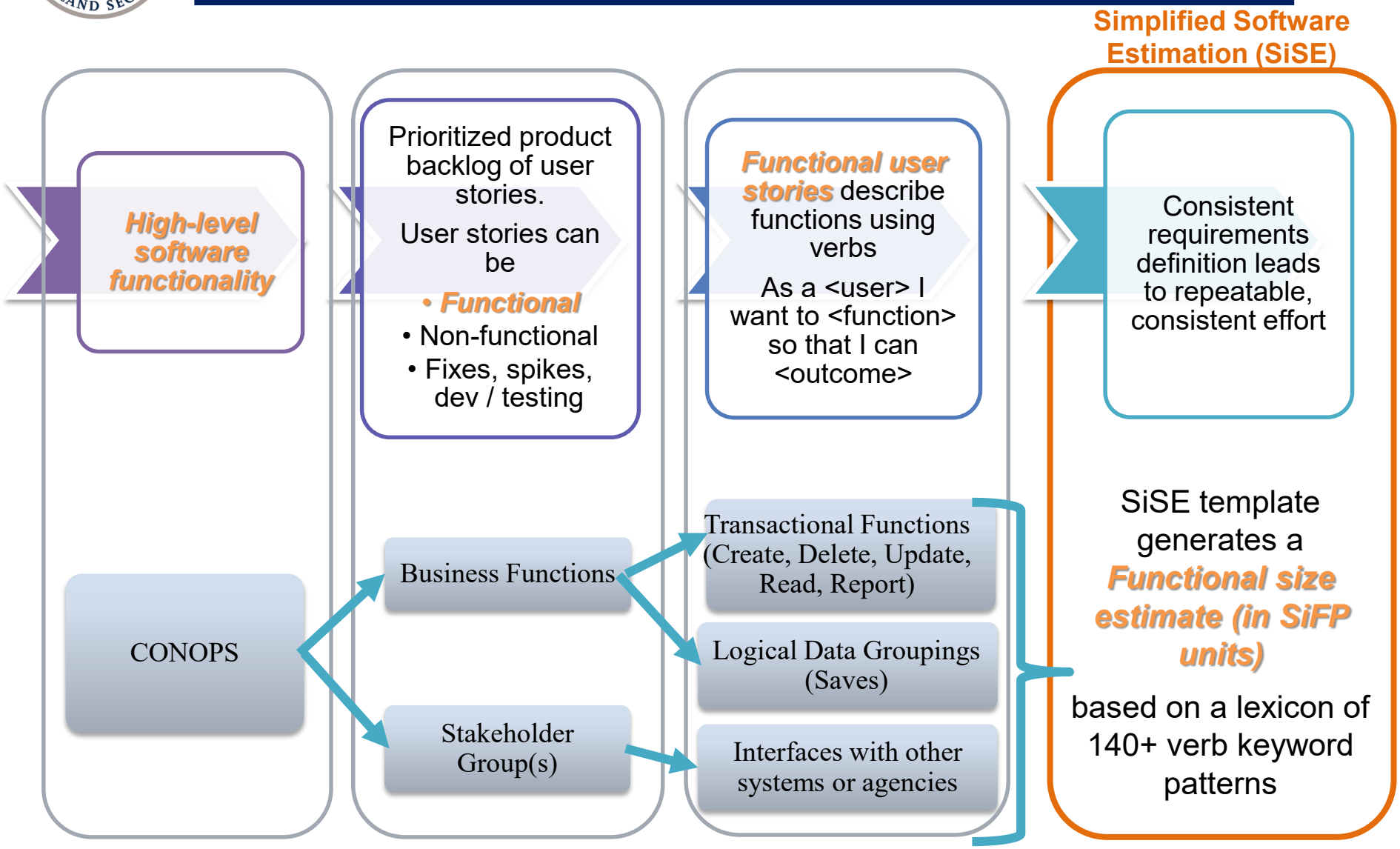
- SiFP Method developed by Dr. Roberto Meli and Italian researchers, and acquired by IFPUG in 2019[1]
- Simplifies functional sizing into two types of functions:
  - Generic Transactional Functions (elementary processes)
  - Generic Logical Data Groups
- Sizing process can be performed quickly and early in a program's lifecycle using existing documents. Compatible with IFPUG FP

	FP Values		
IFPUG Components	Low	Average	High
External Inputs	3	4	6
External Outputs	4	5	7
External Inquiries	3	4	6
Internal Logical Files	7	10	15
External Interface Files	5	7	10

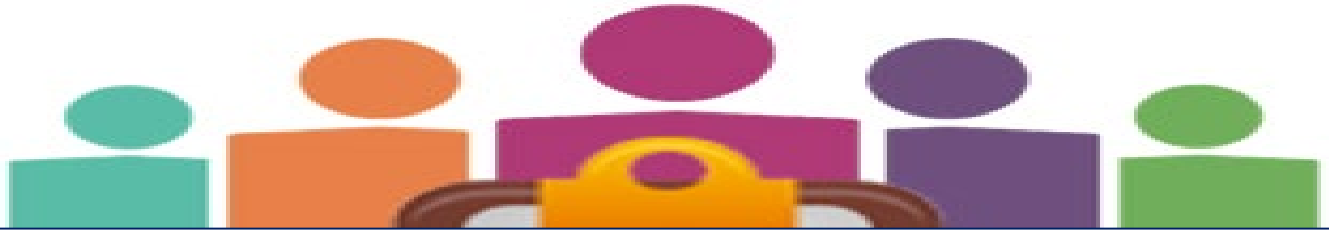
SiFP Components	SiFP Value
Transactions (Create, Update, Delete, Report, Read)	4.6 SiFP
Logical Data Groups (Saves)	7 SiFP

1. https://www.ifpug.org/ifpug-acquires-the-simple-function-points-method/

Issue #2: How to Estimate SiFP from CONOPS/User Stories?



Poll Question #4



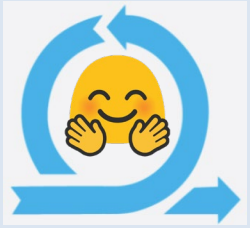
What is your level of knowledge of Functional Sizing?

a. What's functional sizing?
b. I've heard of it, couldn't define it
c. I'm studying the 300+ page IFPUG manual
d. I'm a Certified Function Point Specialist (CFPS)
e. Master Yoda I am at Functional Sizing

Why does DHS need SiSE?

- **Software size** is proven to be ***THE major cost driver of software development***
- Traditional Agile metrics ***difficult to use in software estimating:***
  - **Agile Velocity** (story points delivered per sprint) is team-specific and based on two non-standard variables:
    - ***Size in story points (SP)*** = team-specific, relative effort value for *completed* user stories *(i.e., non-completed user stories = 0 SP)*
    - ***Per Sprint*** = inconsistent scope capacity (*person hours per sprint can vary by # of* calendar days, and FTE team size)
- Functional size ***measurement*** (function points) requires details that are not yet available when estimating the program

SiSE, used with CONOPS or User Stories, can **consistently and reliably estimate functional size in SiFP units** for agile software development



How does SiSE work? Example of CONOPS Capabilities and SiSE Verb Keywords

Functional Capabilities for Scenario 2a

- Create user accounts for school officials
- Submit school certification petition
- Maintain user accounts for school officials
- Submit school re-certification petition
- Submit certification information updates
- Receive certification/re-certification decisions
- Respond to requests for evidence
- Withdraw certification
- Register school for service interface (batch)
- Appeal certification/re-certification decisions
- Cancel certification appeal

CONOPS operational scenarios

SiSE uses Verb Keyword patterns to generate SiFP values

		Transactions						Data		
Verb Keyword		**Create**	**Update**	**Delete**	**Report**	**Read**		**Save**		**SiFP**
Create		1				1		1		16.2
Appeal			1							4.6
Cancel			1							4.6

SiFP = (4.6 * # of Transactions) + (7.0 * # of Data)

Got CONOPS functions? SiSE them!

PROGRAM NAME:	WEATHER
NAME OF ANALYST/ESTIMATOR:	CAROL
DATE:	7/12/2021

1. SiFP Requirements Estimate Sheet

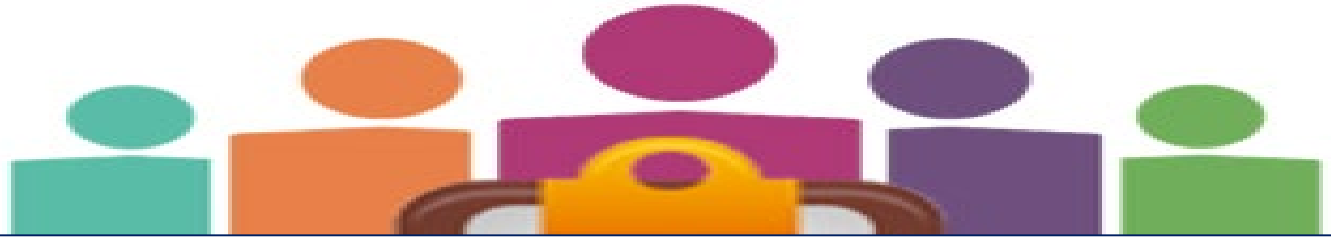
NUMBER	REQUIREMENT DESCRIPTION	Non Functional Requirement?	Verb 1	Verb 2	Verb 3	SiFP (1)	SiFP (2)	SiFP (3)	Total SiFP (row total)	Cumulative SiFPs	Month	Calendar Year	Program Increment/Sprint
1	Create a user account for members of the public *(Note: this is part of Maintaining a user account -*	Not standalone				0.0	0.0	0.0	0.0	0.0			
2	Receive custom alerts to the user's smart phone		Alert			4.6	0.0	0.0	4.6	4.6			
3	Receive custom alerts via email (different alerts from		Alert			4.6	0.0	0.0	4.6	9.2			
4	Maintain user accounts	Maintain is Create, Read, Update, Delete (CRUD) + data store	Maintain			25.4	0.0	0.0	25.4	34.6			
5	The target solution shall have security measures in place to manage the data access and governance and	NFR - security and governance.				0.0	0.0	0.0	0.0	34.6			
6	The WEATHER UI should be updated to display the latest weather Information for a specified geographical region. The user can search for valid specific regions in the continental US	Two functions: 1. Display weather by region - DISPLAY. 2. SEARCH for a listing of valid regions. Note that the verb Update is not a function but implies that the function is being enhanced.	Display	search		4.6	4.6	0.0	9.2	43.8			

SiSE Verb Keywords & Synonyms

- SiSE verb keywords equate to an “established pattern” of functions.
- Simple FP (SiFP) values are assigned to over 400 verbs & synonyms

Keyword	TOTAL FOR VERB SiFP	*Synonyms*
Accept	16.2	*grant, allow*
Activate	16.2	*turn on, start, initiate, initialize, process*
Add	16.2	*append, infuse, inject, insert, introduce*
Adjust	4.6	*accommodate, adapt, conform, edit, fit, tailor*
Alert	4.6	*warn, notify, caution, forewarn*
Allocate	16.2	*apportion, distribute, lot, allot, dispense, partition, prorate, ration, share, slice, split, cut up, divvy*
Allow	16.2	*grant, accept*
Analyze	4.6	*assess, audit, evaluate, examine , review, tabulate*
Apply	16.2	*enforce, execute, implement*
Apportion	16.2	*allocate, allot, cut up, distribute, divvy up, dispense, partition, prorate, ration, slice, split*
Approve	4.6	*accredit, authorize, confirm, finalize, ratify, sanction, warrant*
Assess	4.6	*analyze*
Assign	16.2	*appoint, designate, name, delegate*
Associate	4.6	*affiliate, connect, couple, group, interrelate, link, mingle, tie, join*

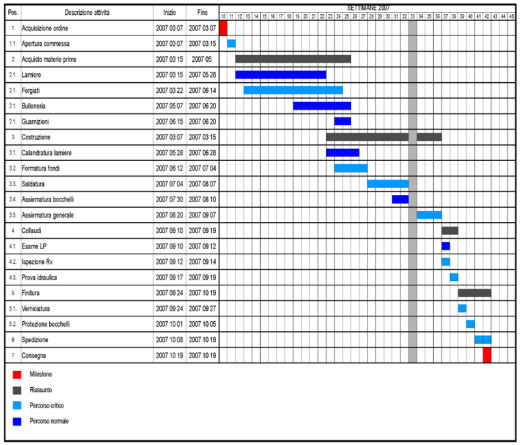
Poll Question #5



Are you interested in developing an SiSE estimate for your program(s)?

a. Yes, but I will need more training
b. Yes, I want a copy of the free SiSE handbook & template
c. Maybe… this looks interesting but it's the first time I've seen SiSE
d. Maybe later, when I have to estimate an Agile program
e. No, I have no need for SiSE
f. No, I'm not interested

What Can You Do with a SiSE Estimate?

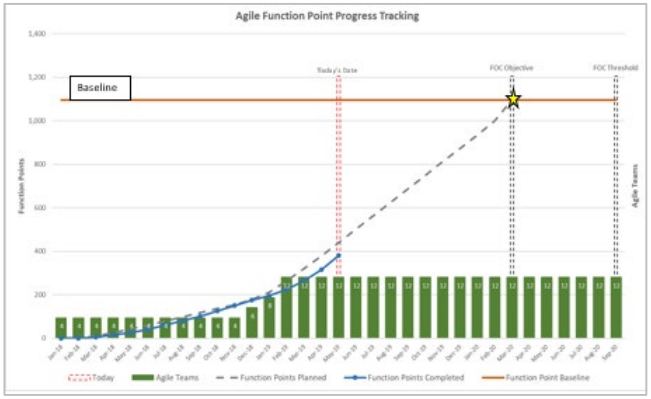


1. Develop Cost & Schedule Estimates

2. Estimate Resources

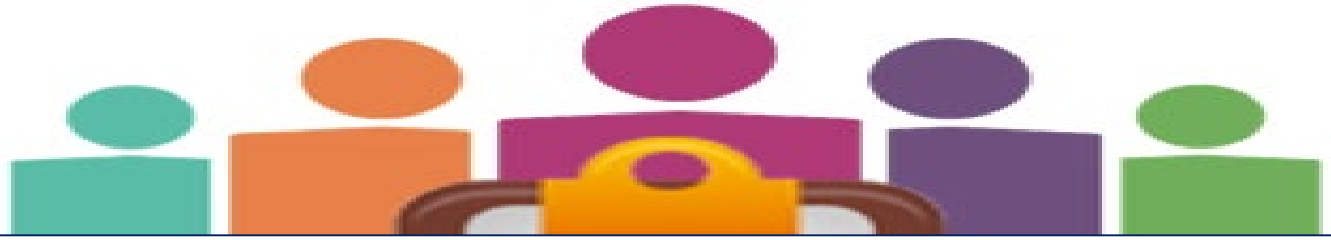
3. Plan Agile Sprints

4. Review Vendor Proposals



5. Track Progress

Poll Question #6

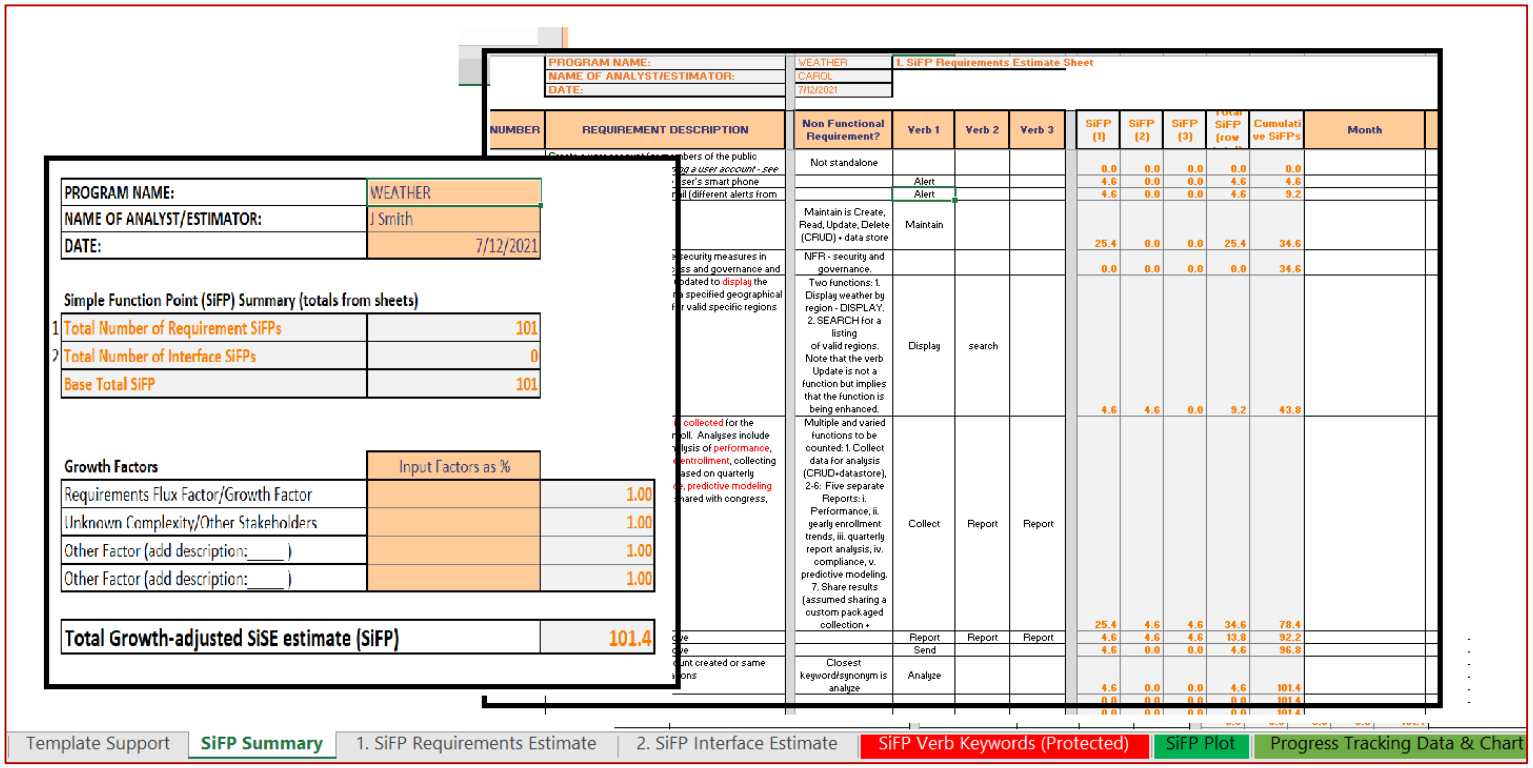


Which of these uses would benefit your organization's programs/projects? (Check all that apply)

a. Develop Cost & Schedule Estimates
b. Estimate Resources
c. Planning Agile Sprints
d. Reviewing Vendor Proposals
e. Track Progress

SiSE Summary

- *Simplified and streamlined functional sizing*
- *Verb keyword lexicon represents functionality patterns*
- *Standardized unit of measure (Simple FP)*



PROGRAM NAME:	WEATHER
NAME OF ANALYST/ESTIMATOR:	J Smith
DATE:	7/12/2021

Simple Function Point (SiFP) Summary (totals from sheets)

1	Total Number of Requirement SiFPs	101
2	Total Number of Interface SiFPs	0
	Base Total SiFP	101

Growth Factors	Input Factors as %	
Requirements Flux Factor/Growth Factor		1.00
Unknown Complexity/Other Stakeholders		1.00
Other Factor (add description:____)		1.00
Other Factor (add description:____)		1.00

Total Growth-adjusted SiSE estimate (SiFP)	101.4

PROGRAM NAME: WEATHER
NAME OF ANALYST/ESTIMATOR: CAROL
DATE: 7/12/2021
1. SiFP Requirements Estimate Sheet

NUMBER	REQUIREMENT DESCRIPTION	Non Functional Requirement?	Verb 1	Verb 2	Verb 3	SiFP (1)	SiFP (2)	SiFP (3)	Total SiFP (row	Cumulative SiFPs	Month
		Not standalone				0.0	0.0	0.0	0.0	0.0	
			Alert			4.6	0.0	0.0	4.6	4.6	
			Alert			4.6	0.0	0.0	4.6	9.2	
		Maintain is Create, Read, Update, Delete (CRUD) + data store	Maintain			25.4	0.0	0.0	25.4	34.6	
		NFR - security and governance.				0.0	0.0	0.0	0.0	34.6	
		Two functions: 1. Display weather by region - DISPLAY. 2. SEARCH for a listing of valid regions. Note that the verb Update is not a function but implies that the function is being enhanced.	Display	search		4.6	4.6	0.0	9.2	43.8	
		Multiple and varied functions to be counted: 1. Collect data for analysis (CRUD+datastore), 2-6: Five separate Reports: i. Performance, ii. yearly enrollment trends, iii. quarterly report analysis, iv. compliance, v. predictive modeling. 7. Share results (assumed sharing a custom packaged collection +	Collect	Report	Report	25.4	4.6	4.6	34.6	78.4	
			Report	Report	Report	4.6	4.6	4.6	13.8	92.2	
			Send			4.6	0.0	0.0	4.6	96.8	
		Closest keyword/synonym is analyze	Analyze			4.6	0.0	0.0	4.6	101.4	

Template Support | SiFP Summary | 1. SiFP Requirements Estimate | 2. SiFP Interface Estimate | SiFP Verb Keywords (Protected) | SiFP Plot | Progress Tracking Data & Chart

SiSE Conclusions

SiSE provides benefits to an agile program:

- Provides a faster, more reliable and repeatable process to produce credible estimates
- Tied to high-level program requirements (i.e., CONOPS)
- Can be performed early in the program's life-cycle

Tracking functional delivery (SiFP) provides insight into overall program progress:

- Plan appropriate program schedule and resources
- Allows issues to be identified early

"Work in Progress":

- We seek to improve based on data and lessons learned to share with the community

How to Get Involved with SiSE

SiSE Products are available to the JITSCF audience:

- Draft Version of SiSE Handbook and Template **-- *available Q1 FY22***

SiSE industry pilot project – starting in Q1 FY22

- Email **Kammy Mann to join [Katharine.Mann@hq.dhs.gov]**

SiSE Support and Resources:

- SiSE training – ***coming soon!***
- SiSE brown bag – ***coming soon!***

www.ifpug.org/metricviews/

Thank you for attending!

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